

- 1 1. A method of assembling a tissue engineered construct, comprising:  
2                   transfecting a plurality of mammalian cells with a gene for a growth factor  
3
- 4 2. The method of claim 1, further comprising culturing the cells until they synthesize  
5 a desired amount of extracellular matrix.  
6
- 7 3. The method of claim 1, further comprising seeding the cells onto a biocompatible  
8 matrix.  
9
- 10 4. The method of claim 3, wherein the matrix comprises a member of a synthetic or  
11 a non-synthetic material.  
12
- 13 5. The method of claim 4, wherein the matrix comprises a member of poly(glycolic  
14 acid), collagen-glycosaminoglycan, collagen, poly(lactic acid), poly(lactic-co-  
15 glycolic acid, poly(anhydride), poly(hydroxy acid), poly(orthoester),  
16 poly(propylfumerate), polysaccharide, polypyrrole, polyaniline, polythiophene,  
17 polystyrene, polyester, polyurethane, polyurea, poly(ethylene vinyl acetate),  
18 polypropylene, polymethacrylate, polyethylene, poly(ethylene oxide),  
19 poly(carbonate), and any combination thereof.  
20
- 21 6. The method of claim 5, wherein the synthetic matrix comprises poly(glycolic  
22 acid).  
23

1 7. The method of claim 1, wherein the cells are human cells.

2

3 8. The method of claim 1, wherein the cells are selected from chondrocytes,  
4 hepatocytes, Islet cells, nerve cells, muscle cells, bone forming cells, fibroblasts,  
5 endothelial cells, stem cells, connective tissue stem cells, mesodermal stem cells,  
6 and epithelial cells.

7

8 9. The method of claim 8, wherein the cells are chondrocytes.

9

10 10. The method of claim 1, further comprising adding a cell attachment facilitator to  
11 the matrix, wherein the cell attachment facilitator comprises a member of  
12 integrins, cell adhesion sequences, basement membrane components, agar, and  
13 collagen.

14

15 11. The method of claim 1, further comprising adding a cell metabolism regulator to  
16 the matrix.

17

18 12. The method of claim 1, wherein the growth factor is a protein.

19

1 13. The method of claim 12, wherein the growth factor is selected from TGF- $\beta$ , TGF-  
2  $\alpha$ , acidic fibroblast growth factor, basic fibroblast growth factor, epidermal  
3 growth factor, IGF-I and II, vascular endothelial-derived growth factor, bone  
4 morphogenetic proteins, hepatocyte, platelet-derived growth factor, heparin  
5 binding growth factor, hematopoietic growth factor, and peptide growth factor.  
6

7 14. The method of claim 13, wherein the growth factor is insulin-like growth factor I.  
8

9 15. The method of claim 1, wherein transfection is accomplished without a viral  
10 vector.  
11

12 16. The method of claim 15, wherein transfection comprises use of a lipid-based  
13 delivery system.  
14

15 17. The method of claim 1, wherein transfection is accomplished with a viral vector.  
16

17 18. A tissue engineered construct, comprising:  
18 a mammalian cell transfected with a gene for a growth factor; and  
19 a biocompatible synthetic matrix.  
20

21 19. The tissue engineered construct of claim 18, wherein the cell is a chondrocyte.  
22

- 1 20. The tissue engineered construct of claim 18, wherein the synthetic matrix  
2 comprises poly(glycolic acid).  
3
- 4 21. The tissue engineered construct of claim 18, wherein the growth factor is insulin-  
5 like growth factor I.  
6
- 7 22. A method of facilitating regeneration of cartilage, comprising:  
8                   transfecting a chondrocyte with a gene for a growth factor;  
9                   seeding the cell onto a biocompatible synthetic matrix;  
10                  implanting the cell-seeded matrix into an *in vivo* site.  
11
- 12 23. The method of claim 22, wherein the synthetic matrix comprises poly(glycolic  
13 acid).  
14
- 15 24. The method of claim 22, wherein the growth factor is insulin-like growth factor I.  
16
- 17 25. The method of claim 22, wherein transfection is accomplished without a viral  
18 vector.  
19
- 20 26. The method of claim 25, wherein transfection comprises use of a lipid based  
21 delivery system.  
22

- 1 27. A transfection vector for a mammalian cell, comprising a gene for a growth  
2 factor.
- 3
- 4 28. The transfection vectors of claim 27, wherein the cell is selected from  
5 chondrocytes, hepatocytes, Islet cells, nerve cells, muscle cells, bone forming  
6 cells, fibroblasts, endothelial cells, stem cells, connective tissue stem cells,  
7 mesodermal stem cells, and epithelial cells.
- 8
- 9 29. The transfection vector of claim 27, wherein the growth factor is a protein.
- 10
- 11 30. The transfection vector of claim 29, wherein the growth factor is selected from  
12 TGF- $\beta$ , TGF- $\alpha$ , acidic fibroblast growth factor, basic fibroblast growth factor,  
13 epidermal growth factor, IGF-I and II, vascular endothelial-derived growth factor,  
14 bone morphogenetic proteins, hepatocyte, platelet-derived growth factor, heparin  
15 binding growth factor, hematopoietic growth factor, and peptide growth factor.
- 16
- 17 31. The transfection vector of claim 30, wherein the growth factor is insulin-like  
18 growth factor I.
- 19
- 20 32. The transfection vector of claim 31, wherein the gene comprises human IGF-I  
21 expression vector pCMVhIGF-I.
- 22



1 41. The plurality of cells of claim 40, wherein the growth factor is insulin like growth  
2 factor I.

3

4 42. The plurality of cells of claim 41, wherein the cells are transfected with a vector  
5 pCMVhIGF-I.

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